



DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. FAA-2019-0919; Project Identifier 2019-NE-24-AD; Amendment 39-21714; AD 2021-18-13]

RIN 2120-AA64

Airworthiness Directives; General Electric Company Turbofan Engines

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final rule.

SUMMARY: The FAA is adopting a new airworthiness directive (AD) for all General Electric Company (GE) CF34-8 model turbofan engines with a certain outer shell combustion liner (combustion outer liner shell) installed. This AD was prompted by two in-flight engine shutdowns (IFSDs) that occurred as a result of failures of the combustion outer liner shell. This AD requires a borescope inspection (BSI) or visual inspection of the combustion outer liner shell and, depending on the results of the inspection, possible replacement of the combustion outer liner shell. The FAA is issuing this AD to address the unsafe condition on these products.

DATES: This AD is effective [INSERT DATE 35 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

The Director of the Federal Register approved the incorporation by reference of certain publications listed in this AD as of [INSERT DATE 35 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

ADDRESSES: For service information identified in this final rule, contact General Electric Company, GE Aviation, Room 285, 1 Neumann Way, Cincinnati, OH 45215; phone: (513) 552-3272; email: aviation.fleetsupport@ge.com. You may view this service information at the FAA, Airworthiness Products Section, Operational Safety Branch, 1200 District Avenue, Burlington, MA 01803. For information on the availability of this material at the FAA, call (781) 238-7759. It is also available at <https://www.regulations.gov> by searching for and locating Docket No. FAA-2019-0919.

Examining the AD Docket

You may examine the AD docket at <https://www.regulations.gov> by searching for and locating Docket No. FAA-2019-0919; or in person at Docket Operations between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The AD docket contains this final rule, any comments received, and other information. The address for Docket Operations is U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue SE, Washington, DC 20590.

FOR FURTHER INFORMATION CONTACT: Scott Stevenson, Aviation Safety Engineer, ECO Branch, FAA, 1200 District Avenue, Burlington, MA 01803; phone: (781) 238-7132; fax: (781) 238-7199; email: Scott.M.Stevenson@faa.gov.

SUPPLEMENTARY INFORMATION:

Background

The FAA issued a notice of proposed rulemaking (NPRM) to amend 14 CFR part 39 by adding an AD that would apply to all CF34-8C1, CF34-8C5, CF34-8C5A1, CF34-8C5B1, CF34-8C5A2, CF34-8C5A3, CF34-8E2, CF34-8E2A1, CF34-8E5, CF34-8E5A1, CF34-8E5A2, CF34-8E6, and CF34-8E6A1 model turbofan engines with a certain combustion outer liner shell installed. The NPRM published in the *Federal Register* on January 10, 2020 (85 FR 1292). The NPRM was prompted by reports of two IFSDs on GE CF34-8C and -8E model turbofan engines. These IFSDs were due to the cracking and collapsing of the combustion outer liner shell, which resulted in thermal distress of the high-pressure turbine and low-pressure turbine (LPT) including burn-through of the LPT case. In the NPRM, the FAA proposed to require a BSI or visual inspection of the combustion outer liner shell and, depending on the results of the inspection, possible replacement of the combustion outer liner shell. The FAA is issuing this AD to address the unsafe condition on these products.

Discussion of Final Airworthiness Directive

Comments

The FAA received comments from four commenters. The commenters were Horizon Air, Japan Airlines, Endeavor Air, and the Air Line Pilots Association,

International (ALPA). The following presents the comments received on the NPRM and the FAA's response to each comment.

Request to Change the Initial Compliance Time

Horizon Air requested the FAA revise the initial inspection threshold in proposed paragraph (g)(2) of the NPRM to "17,499 flight hours (FHs) time since new (TSN) or time since repair (TSR), or 12,000 flight cycles (FCs) TSN or TSR, whichever occurs later." Horizon Air reasoned that the initial inspection threshold in paragraph (g)(2) of the proposed AD would unfairly penalize operators, like Horizon Air, with high FH to FC ratios. Horizon Air further stated that using the higher FH to FC ratios, the proposed 17,499 FHs TSN or TSR inspection threshold would equate to approximately 11,000 engine FCs. This FC value is substantially below the GE targeted initial engine shop visit threshold of 12,000 to 14,000 FCs and would potentially result in a significant increase in the number of engine shop visits over the 6- to 12-year operating lifespan of each engine.

The FAA partially agrees. While the failure mode is partially related to FCs, the compliance is published in FHs to align with existing maintenance intervals. Incorporating both measures as intervals into this AD is impractical; however, operators may request an alternative method of compliance (AMOC) in accordance with the procedures specified in paragraph (k) of this AD to use alternate intervals. The FAA did not change this AD as a result of this comment.

Request to Change the Installation Prohibition

Horizon Air requested the FAA revise paragraph (h), Installation Prohibition, as proposed in the NPRM, so it does not conflict with the proposed required actions specified in paragraph (g)(1) of the NPRM. Horizon Air stated that paragraph (h) of the proposed AD prohibits installation of a combustion outer liner shell with greater than 17,500 FHs TSN or TSR, without first inspecting it in accordance with paragraph (g)(1) of the proposed AD. However, paragraph (g)(1) of the proposed AD requires inspection of the combustion outer liner shell within 500 engine FHs TSN or TSR for those combustion outer liner shells that have accumulated 17,500 FHs TSN or TSR. Horizon Air concluded that the 18,000 FHs TSN or TSR limitation specified in paragraph (g)(1)

of the proposed AD conflicts with the 17,500 FHs TSN or TSR limit specified in paragraph (h) of the proposed AD.

The FAA disagrees. The initial inspection threshold is 17,500 FHs for affected engines. This AD provides a grace period of 500 FHs for in-service engines to prevent the unintentional grounding of airplanes with affected engines. The FAA did not change this AD as a result of this comment.

Request to Include a Terminating Action

Horizon Air requested the FAA petition GE for a terminating action to the inspection requirements in the proposed AD. Horizon Air commented the financial cost and maintenance burden of performing the repetitive inspections are significant.

The FAA disagrees. The FAA considers this AD to be interim action and will consider further rulemaking if the manufacturer develops a terminating action. The FAA included all estimated costs in the Costs of Compliance section in the preamble of this AD. The FAA did not change this AD as a result of this comment.

Request to Revise Service Information References

Horizon Air, Japan Airlines, and Endeavor Air requested the FAA update references to GE CF34-8E Alert Service Bulletin (SB) 72-A0221 and GE CF34-8C Alert SB 72-A0335 in the Required Actions section, paragraph (g), of the proposed AD. Japan Airlines requested that GE CF34-8E-AL S/B 72-A0221, Original Issue, dated June 27, 2019, be added to the compliance paragraphs because the Original Issue and R01 have the same inspection methods and limits. Horizon Air requested that the FAA reference only GE CF34-8E Alert SB 72-A0221 R01 in paragraph (g) of the proposed AD and add a Previous Credit section to allow previous compliance using the Original Issue. Endeavor Air requested that the FAA reference the latest revision of GE CF34-8C Alert SB 72-A0335 in proposed paragraph (g). Endeavor Air indicated that GE planned to issue R02 of CF34-8C Alert SB 72-A0335 on February 24, 2020.

The FAA agrees to reference the latest revision of these Alert SBs, which is R02 for both GE CF34-8C Alert SB 72-A0335 and GE CF34-8E Alert SB 72-A0221, in paragraph (g) of this AD. The FAA disagrees with the need to reference prior revisions of these Alert SBs in paragraphs (g) of this AD but agrees to add Credit for Previous

Actions, paragraph (j), to this AD to allow credit for performing inspections prior to the effective date of this AD. These changes impose no additional burden on operators who are required to comply with this AD.

Request to Clarify Compliance

Japan Airlines requested that the FAA clarify whether the inspection should occur “before” or “within” 500 FHs after the effective date of this AD. Japan Airlines reasoned that the service bulletin specifies to inspect “before” 500 FHs, while the NPRM proposed to inspect “within” 500 FHs.

The FAA agrees. The FAA revised Required Actions, paragraphs (g)(1) and (2) of this AD to specify, “before accumulating 500 engine FHs.”

Support for the AD

ALPA expressed support for the NPRM as written.

Conclusion

The FAA reviewed the relevant data, considered any comments received, and determined that air safety requires adopting this AD as proposed. Accordingly, the FAA is issuing this AD to address the unsafe condition on these products. Except for minor editorial changes, and any other changes described previously, this AD is adopted as proposed in the NPRM. None of the changes will increase the economic burden on any operator.

Related Service Information under 1 CFR Part 51

The FAA reviewed General Electric CF34-8C Alert SB 72-A0335 R02 and General Electric CF34-8E Alert SB 72-A0221 R02, both dated February 25, 2020. The Alert SBs specify procedures for performing a BSI of the combustion outer liner shell. These documents are distinct since they apply to different engine models. This service information is reasonably available because the interested parties have access to it through their normal course of business or by the means identified in ADDRESSES.

Interim Action

The FAA considers this AD to be an interim action. If final action is later identified, the FAA might consider further rulemaking.

Costs of Compliance

The FAA estimates that this AD affects 1,535 engines installed on airplanes of U.S. registry.

The FAA estimates the following costs to comply with this AD:

Estimated costs

Action	Labor Cost	Parts Cost	Cost per product	Cost on U.S. operators
BSI or visually inspect the combustion outer liner shell	3 work-hours x \$85 per hour = \$255	\$0	\$255	\$391,425

The FAA estimates the following costs to do any necessary replacements that would be required based on the results of the inspection. The agency has no way of determining the number of engines that might need this replacement:

On-condition costs

Action	Labor Cost	Parts Cost	Cost per product
Replace the combustion outer liner shell	812 work-hours x \$85 per hour = \$69,020	\$80,000	\$149,020

Authority for this Rulemaking

Title 49 of the United States Code specifies the FAA's authority to issue rules on aviation safety. Subtitle I, section 106, describes the authority of the FAA Administrator. Subtitle VII: Aviation Programs, describes in more detail the scope of the Agency's authority.

The FAA is issuing this rulemaking under the authority described in Subtitle VII, Part A, Subpart III, Section 44701: General requirements. Under that section, Congress charges the FAA with promoting safe flight of civil aircraft in air commerce by prescribing regulations for practices, methods, and procedures the Administrator finds necessary for safety in air commerce. This regulation is within the scope of that authority because it addresses an unsafe condition that is likely to exist or develop on products identified in this rulemaking action.

Regulatory Findings

This AD will not have federalism implications under Executive Order 13132. This AD will not have a substantial direct effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.

For the reasons discussed above, I certify that this AD:

- (1) Is not a “significant regulatory action” under Executive Order 12866,
- (2) Will not affect intrastate aviation in Alaska, and
- (3) Will not have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act.

List of Subjects in 14 CFR Part 39

Air transportation, Aircraft, Aviation safety, Incorporation by reference, Safety.

The Amendment

Accordingly, under the authority delegated to me by the Administrator, the FAA amends 14 CFR part 39 as follows:

PART 39 - AIRWORTHINESS DIRECTIVES

- 1. The authority citation for part 39 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701.

§ 39.13 [Amended]

- 2. The FAA amends § 39.13 by adding the following new airworthiness directive:

2021-18-13 General Electric Company: Amendment 39-21714; Docket No. FAA-2019-0919; Project Identifier 2019-NE-24-AD.

(a) Effective Date

This airworthiness directive (AD) is effective [INSERT DATE 35 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

(b) Affected ADs

None.

(c) Applicability

This AD applies to General Electric Company (GE) CF34-8C1, CF34-8C5, CF34-8C5A1, CF34-8C5B1, CF34-8C5A2, CF34-8C5A3, CF34-8E2, CF34-8E2A1, CF34-

8E5, CF34-8E5A1, CF34-8E5A2, CF34-8E6, and CF34-8E6A1 model turbofan engines with an outer shell combustion liner (combustion outer liner shell), part number (P/N) 4124T04G04, P/N 4124T04G05, or P/N 5159T35G02, installed.

(d) Subject

Joint Aircraft System Component (JASC) Code 7240, Turbine Engine
Combustion Section.

(e) Unsafe Condition

This AD was prompted by two in-flight engine shutdowns (IFSDs) that occurred as a result of failures of the combustion outer liner shell. The FAA is issuing this AD to prevent failure of the combustion outer liner shell. The unsafe condition, if not addressed, could result in burn-through of the low-pressure turbine case, engine fire, and damage to the airplane.

(f) Compliance

Comply with this AD within the compliance times specified, unless already done.

(g) Required Actions

(1) For an affected engine with a combustion outer liner shell that on the effective date of this AD has accumulated 17,500 flight hours (FHs) or greater time since new (TSN), or time since repair (TSR), perform an initial borescope inspection (BSI) or visual inspection of the combustion outer liner shell for cracks before accumulating 500 engine FHs after the effective date of this AD.

(i) For GE CF34-8C engines, inspect using the Accomplishment Instructions, paragraphs 3.A.(4) and 3.A.(5), of GE CF34-8C Alert Service Bulletin (SB) 72-A0335 R02, dated February 25, 2020 (CF34-8C Alert SB 72-A0335).

(ii) For GE CF34-8E engines, inspect using the Accomplishment Instructions, paragraphs 3.A.(4) and 3.A.(5), of GE CF34-8E Alert SB 72-A0221 R02, dated February 25, 2020 (CF34-8E Alert SB 72-A0221).

Note 1 to paragraph (g)(1): GE has identified the service information as an “Alert Service Bulletin,” which is stated only in the body of the Alert SB.

(2) For an affected engine with a combustion outer liner shell that on the effective date of this AD has accumulated 17,499 FHs or fewer TSN or TSR, before accumulating

500 engine FHs after the combustion outer liner shell has accumulated 17,500 FHs TSN or TSR, perform an initial BSI or visual inspection on the combustion outer liner shell for cracks.

(i) For GE CF34-8C engines, inspect using the Accomplishment Instructions, paragraphs 3.A.(4) and 3.A.(5), of CF34-8C Alert SB 72-A0335.

(ii) For GE CF34-8E engines, inspect using the Accomplishment Instructions paragraphs 3.A.(4) and 3.A.(5), of CF34-8E Alert SB 72-A0221.

(3) For an affected engine with a combustion outer liner shell for which it is not possible to determine the TSN or TSR, use the engine FHs since new to determine when to perform the initial BSI or visual inspection.

(4) After the effective date of this AD, and after the initial inspection required by paragraph (g)(1) or (2) of this AD, re-inspect or remove the combustion outer liner shell using inspection criteria as follows:

(i) For GE CF34-8C engines, use Table 1 of CF34-8C Alert SB 72-A0335.

(ii) For GE CF34-8E engines, use Table 1 of CF34-8E Alert SB 72-A0221.

(h) Installation Prohibition

After the effective date of this AD, do not install a combustion outer liner shell with greater than 17,500 FHs TSN or TSR without first inspecting the combustion outer liner shell in accordance with paragraph (g)(1) of this AD.

(i) Definition

For the purpose of this AD, “time since repair (TSR)” is the amount of FHs accumulated on the combustion outer liner shell since performing GEK 105091 or GEK 112031, 72-44-06, REPAIR 023.

(j) Credit for Previous Actions

You may take credit for any initial BSI or visual inspection of the combustion outer liner shell required by paragraphs (g)(1) and (2) of this AD if you performed the initial BSI or visual inspection before the effective date of this AD using:

(1) GE CF34-8C-AL S/B 72-A0335, Original Issue, dated June 27, 2019;

(2) GE CF34-8C Alert SB 72-A0335 R01, dated September 23, 2019;

(3) GE CF34-8E-AL S/B 72-A0221, Original Issue, dated June 27, 2019; or

(4) GE CF34-8E Alert SB 72-A0221 R01, dated September 23, 2019.

(k) Alternative Methods of Compliance (AMOCs)

(1) The Manager, ECO Branch, FAA, has the authority to approve AMOCs for this AD, if requested using the procedures found in 14 CFR 39.19. In accordance with 14 CFR 39.19, send your request to your principal inspector or local Flight Standards District Office, as appropriate. If sending information directly to the manager of the certification office, send it to the attention of the person identified in Related Information. You may email your request to: ANE-AD-AMOC@faa.gov.

(2) Before using any approved AMOC, notify your appropriate principal inspector, or lacking a principal inspector, the manager of the local flight standards district office/certificate holding district office.

(l) Related Information

For more information about this AD, contact Scott Stevenson, Aviation Safety Engineer, ECO Branch, FAA, 1200 District Avenue, Burlington, MA 01803; phone: (781) 238-7132; fax: (781) 238-7199; email: Scott.M.Stevenson@faa.gov.

(m) Material Incorporated by Reference

(1) The Director of the Federal Register approved the incorporation by reference (IBR) of the service information listed in this paragraph under 5 U.S.C. 552(a) and 1 CFR part 51.

(2) You must use this service information as applicable to do the actions required by this AD, unless the AD specifies otherwise.

(i) GE CF34-8C Alert Service Bulletin (SB) 72-A0335 R02, dated February 25, 2020.

(ii) GE CF34-8E Alert SB 72-A0221 R02, dated February 25, 2020.

(3) For GE service information identified in this AD, contact General Electric Company, GE Aviation, Room 285, 1 Neumann Way, Cincinnati, OH 45215; phone: (513) 552-3272; email: aviation.fleetsupport@ge.com.

(4) You may view this service information at FAA, Airworthiness Products Section, Operational Safety Branch, 1200 District Avenue, Burlington, MA 01803. For information on the availability of this material at the FAA, call (781) 238-7759.

(5) You may view this service information that is incorporated by reference at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, email: fr.inspection@nara.gov, or go to: <https://www.archives.gov/federal-register/cfr/ibr-locations.html>.

Issued on August 26, 2021.

Lance T. Gant, Director,
Compliance & Airworthiness Division,
Aircraft Certification Service.

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